

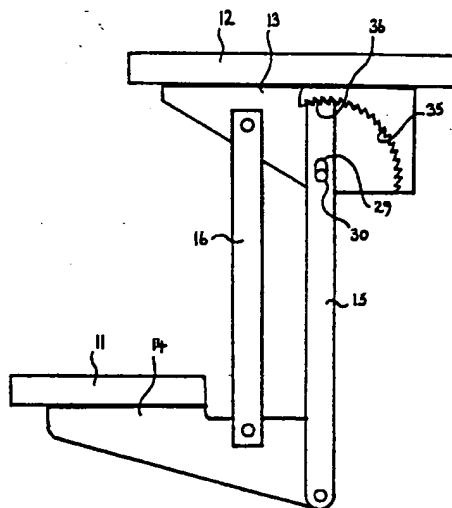


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>5</sup> :</b> <b>A47B 17/02, 17/03, 21/02</b> <b>A47B 21/03</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 93/25115</b> <b>(43) International Publication Date:</b> 23 December 1993 (23.12.93)
<b>(21) International Application Number:</b> PCT/AU93/00264 <b>(22) International Filing Date:</b> 3 June 1993 (03.06.93)  <b>(30) Priority data:</b> PL 2803                      5 June 1992 (05.06.92)                      AU PL 2812                      8 June 1992 (08.06.92)                      AU  <b>(71) Applicant (for all designated States except US):</b> TRENTON PTY. LTD. [AU/AU]; Unit 8, 5-7 Jarvis Street, O'Connor, W.A. 6163 (AU).  <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only):</b> RUSSELL, Edwin, Robin [AU/AU]; Unit 8, 5-7 Jarvis Street, O'Connor, W.A. 6163 (AU).  <b>(74) Agents:</b> HARWOOD, Errol, John et al.; Wray & Associates, Primary Industry House, 239 Adelaide Terrace, Perth, W.A. 6000 (AU).		<b>(81) Designated States:</b> AT, AU, BB, BG, BR, CA, CH, CZ, DE, DK, ES, FI, GB, HU, JP, KP, KR, KZ, LK, LU, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SK, UA, US, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>

**(54) Title:** SUPPORT MEANS**(57) Abstract**

A support means for supporting a movable element (11) from a fixed element (12) whereby the movable element (11) is movable relative to the fixed element (12), the support means comprising a first support element (13) adapted to be mounted to the fixed element (11), and a second support element (14) adapted to be affixed to said movable element (12), a pair of linkage elements (15 and 16) each pivotally fixed at one end to said first element (13) at spaced locations on the first element (13) and each pivotally mounted at the other end to the second element (14) at spaced locations on the second element (14) to enable relative movement of the second support element (14), whereby throughout such movement the attitude of the second support element (14) remains substantially constant, the support means further comprising a locking means for locking said second support element in a range of positions, the locking means comprising a first engagement face (35) on one support element (13) which is engageable with a second engagement face (36) provided on one linkage element (15), said one linkage element (15) being displaceable relative to the one support element (13) to cause relative movement between the engagement faces between an engaged position and an unengaged position, whereby when said engagement faces (35 and 36) are in the unengaged position the second support element (14) is capable of said movement relative to the first support element (13), wherein the engageable faces (35 and 36) are part circular and are concentric about a pivot axis (30) between the one linkage element (15) and the one support element (13) and are adapted to retain the second element (14) relative to the first element (13) in any one of said range of positions, and the engagement faces being gravitationally biased into engagement with each other.



**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	FR	France	MR	Mauritania
AU	Australia	GA	Gabon	MW	Malawi
BB	Barbados	GB	United Kingdom	NL	Netherlands
BE	Belgium	GN	Guinea	NO	Norway
BF	Burkina Faso	GR	Greece	NZ	New Zealand
BG	Bulgaria	HU	Hungary	PL	Poland
BJ	Benin	IE	Ireland	PT	Portugal
BR	Brazil	IT	Italy	RO	Romania
CA	Canada	JP	Japan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SK	Slovak Republic
CI	Côte d'Ivoire	LJ	Liechtenstein	SN	Senegal
CM	Cameroon	LK	Sri Lanka	SU	Soviet Union
CS	Czechoslovakia	LU	Luxembourg	TD	Chad
CZ	Czech Republic	MC	Monaco	TG	Togo
DE	Germany	MG	Madagascar	UA	Ukraine
DK	Denmark	ML	Mali	US	United States of America
ES	Spain	MN	Mongolia	VN	Viet Nam
FI	Finland				

## SUPPORT MEANS

THIS INVENTION relates to a work surface support.

A particular application of the invention relates to the support for a keyboard for a computer work station.

In one form, the invention resides in a support means for supporting a movable element from a fixed element whereby the movable element is movable relative to the fixed element, said support means comprising a first support element adapted to be mounted to the fixed element, a second support element adapted to be affixed to said movable element, a pair of linkage elements each pivotally fixed at one end to said first element at spaced locations on said first element and each pivotally mounted at the other end to said second element at spaced locations on said second element to enable relative movement of the second support element, whereby throughout such movement the attitude of said second support element remains substantially constant, said support means further comprising a locking means for locking said second support element in a range of positions, said locking means comprising a first engagement face on one support element which is engagable with a second engagement face provided on one linkage element, said one linkage element being displaceable relative to the one support element to cause relative movement between the engagement faces between an engaged position and an unengaged position, whereby when said engagement faces are in the unengaged position the second support element is capable of said movement relative to the first support element, wherein the engagable faces are part circular and are concentric about a pivot axis between the one linkage element and the one support element and are adapted to retain the second element relative to the first element in any one of said range of positions,

and the engagement faces being gravitationally biased into engagement with each other..

According to a preferred feature of the invention the engagable faces are frictionally engaged when engaged with each other.

According to a further preferred feature of the invention one engagement face has a convex V-shaped profile and the other engagement face has a concave V-shaped profile.

According to a preferred feature of the previous feature the divergence of the V-shaped profile of the one face is less than the divergence of the V-shaped profile of the other face.

According to a preferred feature of the invention the engagement faces become wedgingly engaged when in the engaged position.

According to a further preferred feature of the invention engagement faces are of complementary serrated profile.

The invention will be more fully understood in the light of the following description of two specific embodiments. The description is made with reference to the accompany drawings in which:-

Figure 1 is a side elevation of the first embodiment in the second position with the locking surfaces engaged;

Figure 2 is a side elevation of the first embodiment in the second position with the locking surfaces disengaged;

Figure 3 is a side elevation of the first embodiment in the first position;

Figure 4 is a side elevation of the second embodiment in one position with the locking surfaces engaged;

Figure 5 is a side elevation of the second embodiment in the second position with the locking surfaces disengaged; and

Figure 6 is a sectional view of the engagement surfaces of the second embodiment.

The first embodiment shown at Figure 1 comprises a support for a support platform 11 to facilitate movement of the support platform 11 relative to a fixed member 12 whereby the support platform 11 is movable between a position in front of the fixed member 12 as shown at Figure 1, and a position below the fixed member 12 as shown at Figure 3.

The support comprises a first support member 13 which is adapted to be fixed underneath the fixed member 12 and a second support member and which extends rearwardly with respect to the support platform 11. The first and second support members 13 and 14 are interconnected by a pair of substantially parallel link elements 15 and 16 which are pivotally connected at their ends to the first support member 13 and second support member 14 respectively at spaced positions on the respective members. The result of the presence of the parallelogram linkage provided by link elements 15 and 16 and their pivotal interconnection with the first and second support members at 13 and 14 is such that support platform 11 is capable of movement from a position in front of the fixed member 12 to a position below the fixed member 12 as shown whereby throughout such

movement the attitude of the support platform 11 remains substantially constant.

One linkage member 15 is supported on the first support member 13, through a slotted aperture 29 which is receivable on a pivot pin 30 fixed to the first support member 13. As a result of the slotted aperture the one linkage member 14 is capable of some axial displacement on the first support member 13. This axial displacement is effected by causing the support platform 11 to rotate on its pivotal mounting to the other linkage element 16.

Locking of the support platform is provided by a pair of part circular locking surfaces 35 and 36 which are concentric with the pivot pin 30 as the centre. In addition the slotted aperture 29 is aligned with a radius of said locking surfaces.

One locking surface 35 is provided on the first support member 13 and the other locking surface is provided on the end of the one linkage element 15 which extends beyond the slotted aperture 29. With relative displacement between the one linkage element and the first support element over the pivot pin 30 the locking surfaces are selectively brought into and out of engagement. In addition the weight of the support platform; its contents, the second support element 16 and the linkage elements beyond their pivotal connection to the first support element 15 serve to gravitationally bias the locking surfaces into locking engagement. The first locking surface has an arcuate extent corresponding to the full range of movement of the second locking surface with pivotal movement of the support surface between its end position.

The locking surfaces are serrated to ensure the locking engagement therebetween. In addition each serration has a

ratchet-like profile whereby the one linkage element 15 is able to move to carry the support platform upwardly without positive displacement between the locking surfaces. To lower the support platform it is raised at its forwardmost edge to cause disengagement between the locking surfaces whereupon the support platform can be lowered.

The second embodiment shown at Figures 4, 5 and 6 is directed to a desk or like work station which has a support platform 111 movably supported from a fixed member 112. The embodiment provides an adjustable support for a support platform 111 to facilitate movement of the support platform 111 relative to a fixed member 112 whereby the support platform 111 is movable between a position in front of the fixed member 112 as shown at Figure 4, and a position below the fixed member 112 as shown at Figure 6.

The support comprises a first support member 113 which is adapted to be fixed underneath the fixed member 112 and a second support member 114 which is adapted to be fixed under the support platform and which extends rearwardly with respect to the support platform 111. The first and second support members 113 and 114 are interconnected by a pair of substantially parallel link elements 115 and 116 which are pivotally connected at their ends to the first support member 113 and second support member 114 respectively at spaced positions on the respective members. The effect of the presence of the parallelogram linkage provided by link elements 115 and 116 and their pivotal interconnection with the first and second support members at 113 and 114, is such that support platform 111 is capable of movement from a position in front of the fixed member 112 to a position below the fixed member 112 as shown whereby throughout such movement the attitude of the support platform 111 remains substantially constant.

One linkage member 115 is supported on the first support member 113, through a slotted aperture 129 which is receivable on a pivot pin 130 fixed to the first support member 113. As a result of the slotted aperture the one linkage member 115 is capable of some axial displacement on the first support member 113. This axial displacement is effected by causing the support platform 111 to rotate on its pivotal mounting to the other linkage element 116.

Locking of the support platform is provided by a pair of part circular locking surfaces 135 and 136 which are concentric with the pivot pin 130 as the centre. In addition the slotted aperture is aligned with a radius of said locking surfaces. One locking surface 135 is provided on the first support member 113 and the other locking surface is provided on the end portion of the one linkage element 115 which extends beyond the slotted aperture 129. With relative displacement between the one linkage element and the first support element over the pivot pin 130 the locking surfaces are selectively brought into and out of engagement. In addition the weight of the support platform; its contents, the second support element 116 and the linkage elements beyond their pivotal connection to the first support element 115 serve to gravitationally bias the locking surfaces into locking engagement. The one locking surface has an arcuate extent corresponding to the range of movement of the second locking surface with pivotal movement of the support surface between its end positions.

The locking surfaces are frictionally interengaged:

As shown at Figure 3 the first surface 135 has a convex V-shaped cross-sectional profile while the second surface 136 provided on adjacent end of the one link member 115 is formed with a V-shaped groove which is receivable over the first surface 135. In addition the degree of divergence of



the convex surface of the first surface 135 is a little greater than that of the groove forming the second surface 136. On interengagement between the surfaces as a result of the weight of the links 115 and 116 beyond their pivotal connection to the first member 115, the weight of the second member 114 and the weight of the support platform and its contents, the surfaces become intimately interengaged and the groove at the on link member 115 is wedged over the V-shaped profile of the first surface 135. This wedging action increases as the weight on the support platform is increased and thus the retention of the support platform in position is enhanced. In addition the wedging action causes resilient separation of the side faces of the groove which increases the area of the contact surface and the frictional binding forces between the first and second surface. However by lifting the outer edge of the support platform the locking surfaces are readily disengaged.

The embodiment provides a support arrangement where the support platform is not restricted to a number of fixed positions relative to the fixed member which are determined by the nature of the engagement surfaces.

In each of the embodiments the surface area of the second engagement surface is significantly less (e.g. less than half) than the surface area of the first engagement element in order to ensure a high engagement pressure between the surfaces.

It should be appreciated that the scope of the present invention need not be limited to the particular scope of the embodiments described above. In particular the support arrangement of the invention need not be limited to the particular application of the embodiment but can be used in many circumstances where one member is to be supported from another to be movable between a variety of positions.

THE CLAIMS defining the invention are as follows:-

1. A support means for supporting a movable element from a fixed element whereby the movable element is movable relative to the fixed element, said support means comprising a first support element adapted to be mounted to the fixed element, a second support element adapted to be affixed to said movable element, a pair of linkage elements each pivotally fixed at one end to said first element at spaced locations on said first element and each pivotally mounted at the other end to said second element at spaced locations on said second element to enable relative movement of the second support element, whereby throughout such movement the attitude of said second support element remains substantially constant, said support means further comprising a locking means for locking said second support element in a range of positions, said locking means comprising a first engagement face on one support element which is engagable with a second engagement face provided on one linkage element, said one linkage element being displaceable relative to the one support element to cause relative movement between the engagement faces between an engaged position and an unengaged position, whereby when said engagement faces are in the unengaged position the second support element is capable of said movement relative to the first support element, wherein the engagable faces are part circular and are concentric about a pivot axis between the one linkage element and the one support element and are adapted to retain the second element relative to the first element in any one of said range of positions, and the engagement faces being gravitationally biased into engagement with each other.

2. A support means as claimed at claim 1 wherein the engagable faces are adapted to be frictionally engaged.

3. A support means as claimed at claim 2 wherein one engagement face has a substantially convex V-shaped cross-section and the other engagement face has a substantially complementary concave V-shaped cross-sectional profile.

4. A support means as claimed at claim 3 wherein the divergence of the convex V-shaped profile is greater than the degree of divergence of the concave V-shaped profile.

5. A support means as claimed at claim 3 or 4 wherein the engagement faces become wedgingly engaged when in the engaged position.

6. A support means as claimed at claim 1 wherein the engagement faces are of complementary serrated profile.

7. A support means as claimed at claim 1 or 6 wherein the serrations are shaped to allow upward movement of the second support element relative to the first support without disengagement between the engagable faces but prevent downward movement of the second support element relative to the first support element when the engagable face are interengaged.

8. A support means as claimed at any one of the preceding claims wherein the surface area of the first engagement face is less than half of the surface area of the second engagement face.

9. A support means as claimed at claim 8 wherein the second engagement face has an arcuate extent corresponding to the rotation path of the first engagement face on movement of the second support element between its end positions relative to the first support element.

10. A support means as claimed at any one of the preceding claims wherein the first engagement face is provided at one end of the one linkage member.

11. A support means substantially as herein described with reference to the accompanying drawings.

1/5

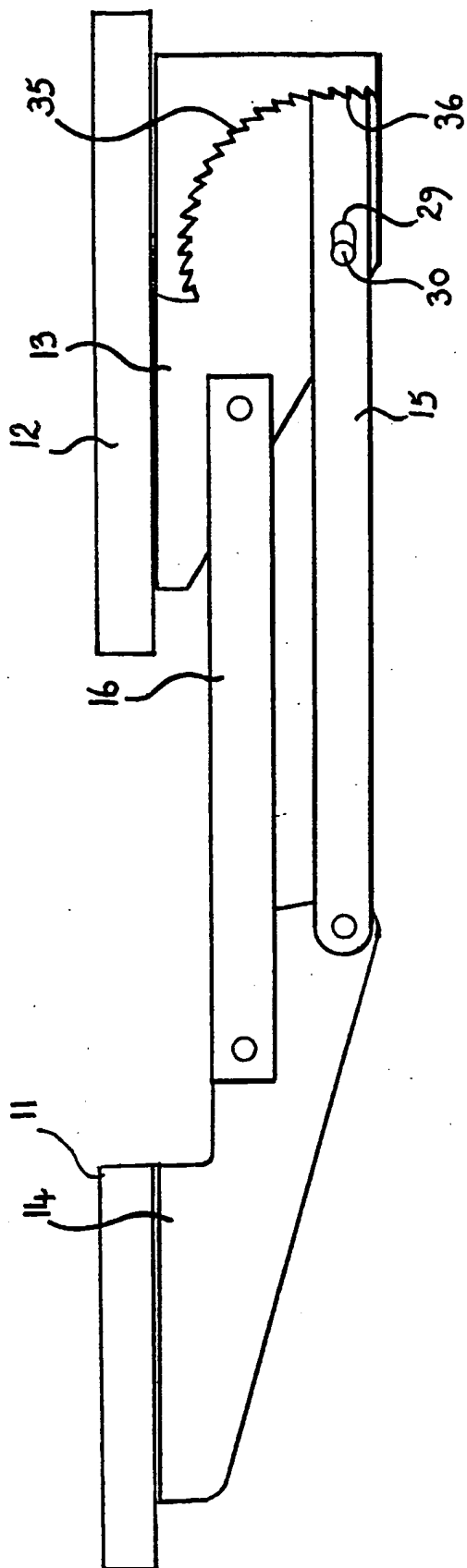
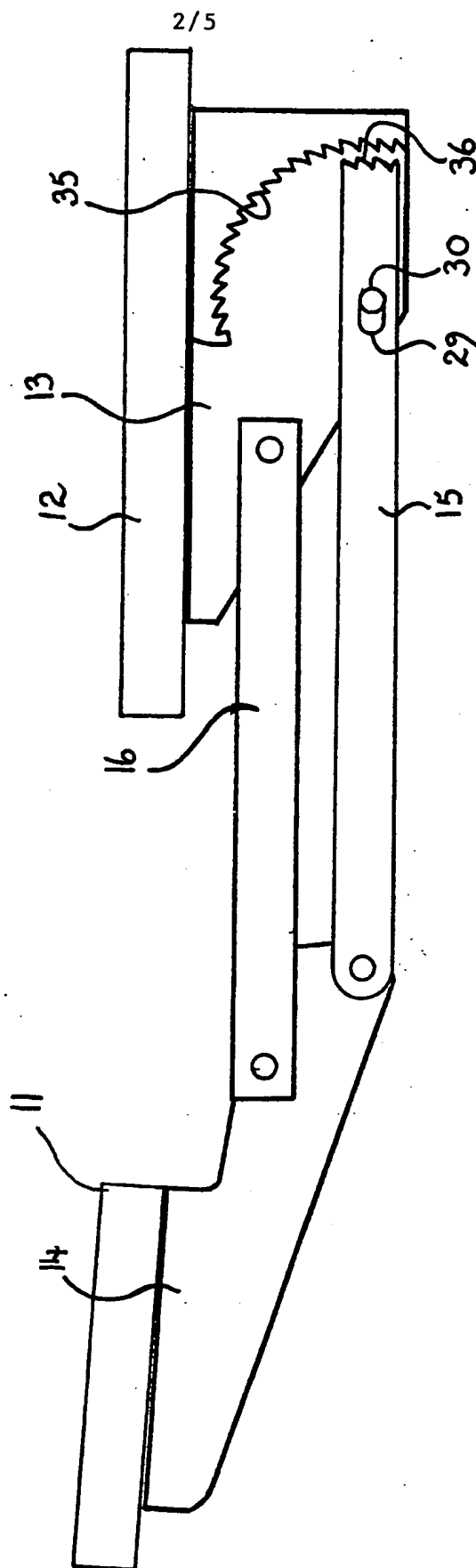
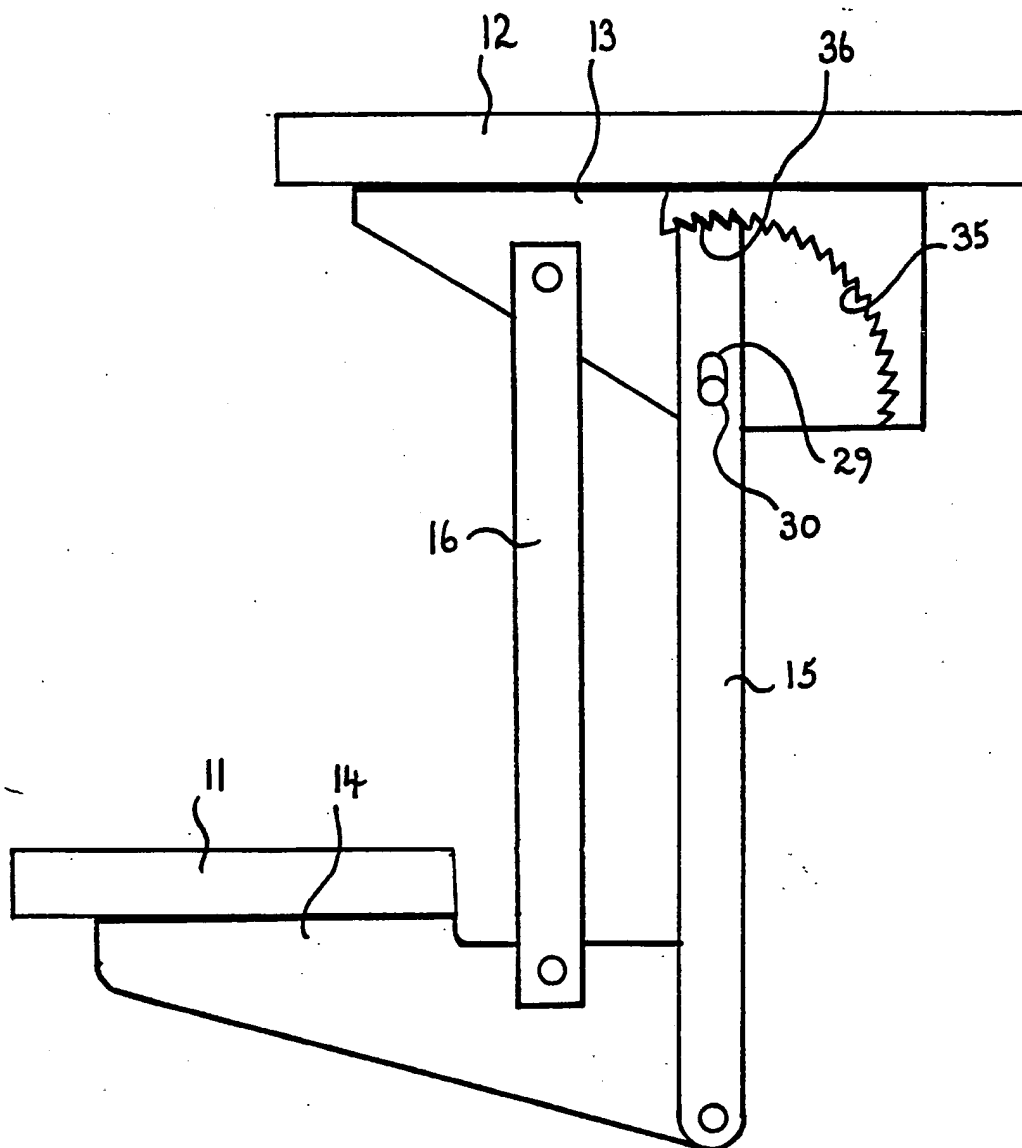


Fig. 1



**Fig. 2**



**Fig. 3.**

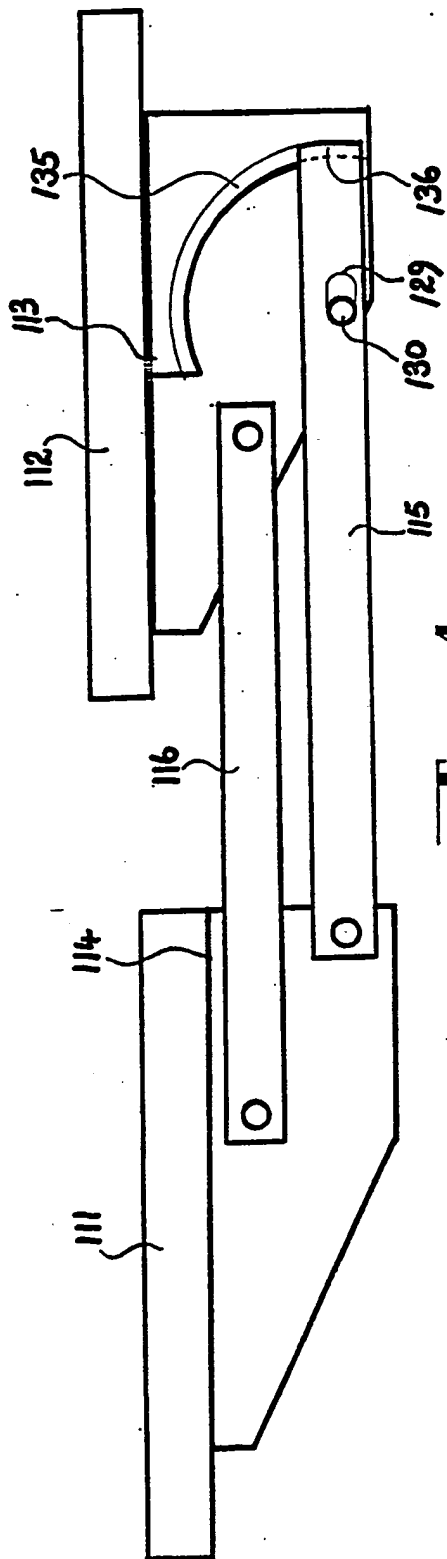


Fig. 4.

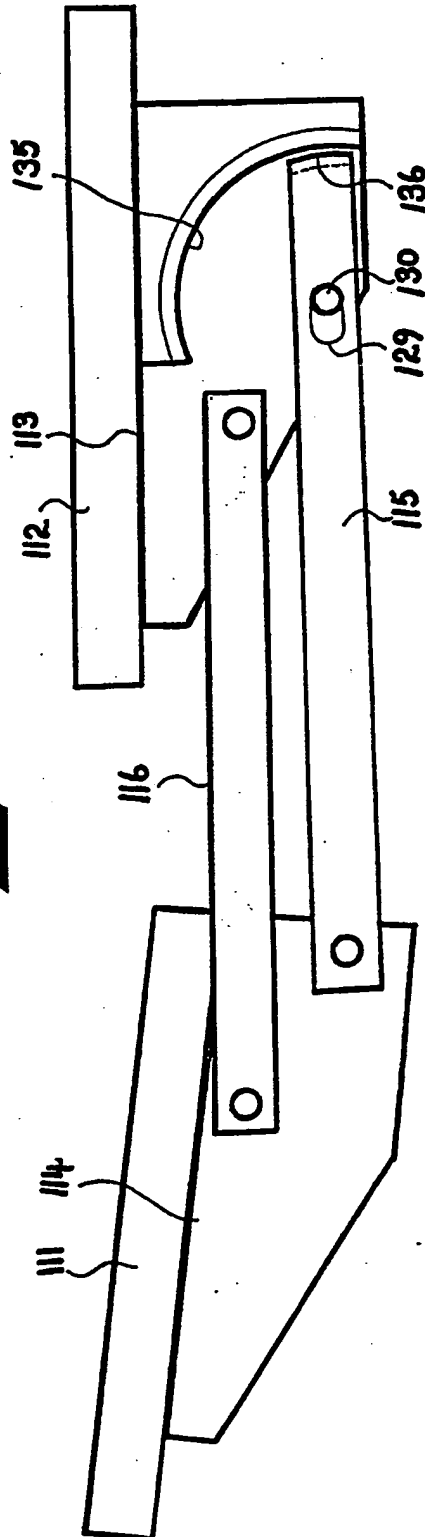
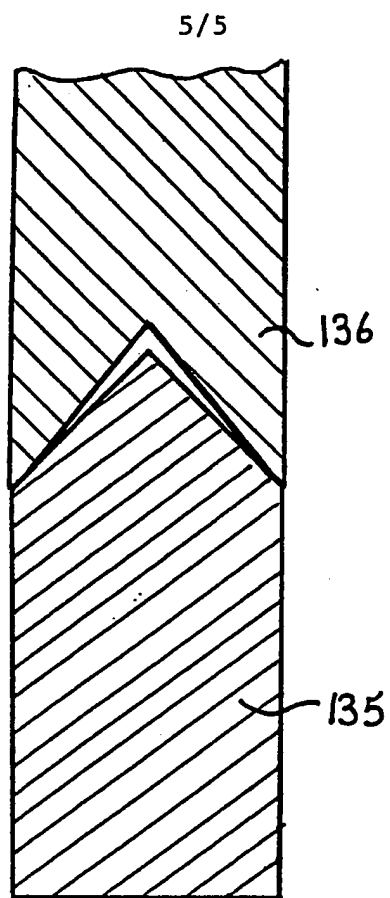


Fig. 5.





**FIG. 6.**

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU 93/00264

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> Int. Cl. <sup>5</sup> A47B 17/02, 17/03, 21/02, 21/03  According to International Patent Classification (IPC) or to both national classification and IPC				
<b>B. FIELDS SEARCHED</b>  Minimum documentation searched (classification system followed by classification symbols) IPC:A47B 17/02, 17/03, 21/02, 21/03  Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU:IPC as above  Electronic data base consulted during the international search (name of data base, and where practicable, search terms used)				
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>				
<b>Category*</b>	<b>Citation of document, with indication, where appropriate, of the relevant passages</b>	<b>Relevant to Claim No.</b>		
y	AU,B,65578/90 (631691) (TRENTON PTY LTD) 9 May 1991 (09.05.91) figure 1,12,13	1-10		
y	AU,B,38179/89 (637320) (COTTERILL) 18 January 1990 (18.01.90) figures 1,2,6,9	1-10		
y	AU,B,69134/91 (635803) (COTTERILL) 18 July 1991 (18.07.91) figures 1 and 2, 11	1-10		
y	US,A,2001507 (STRIBLING) 14 May 1935 (14.05.35) figure 2-6	1-10		
<div style="display: flex; justify-content: space-between;"> <div> <input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.         </div> <div> <input checked="" type="checkbox"/> See patent family annex.         </div> </div>				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>* Special categories of cited documents :</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="width: 50%; vertical-align: top;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p> </td> </tr> </table>			<p>* Special categories of cited documents :</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p>
<p>* Special categories of cited documents :</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p>			
Date of the actual completion of the international search 6 August 1993 (06.08.93)		Date of mailing of the international search report 18 AUG 1993 (18.08.93)		
Name and mailing address of the ISA/AU  AUSTRALIAN INDUSTRIAL PROPERTY ORGANISATION PO BOX 200 WODEN ACT 2606 AUSTRALIA  Facsimile No. 06 2853929		Authorized officer   Peter Ward  Telephone No. (06) 2832129		

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU 93/00264

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate of the relevant passages	Relevant to Claim No.
Y	Derwent Abstract Accession No. K7345B/46, class P25, SU,A,648200 (KIEVPRODMASH) 28 February 1979 (28.02.79) figure 3 and 4	1-10
X	AU,A,19015/88 (601055) (HOOD COMPUTERS PTY LTD) 19 January 1989 (19.01.89) figure 1,2,3	1-10

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.

**PCT/ AU 93/00264**

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member			
AU	65578/90				
AU	38179/89				
AU	69134/91	CA US	2071553 4988066	EP US	506718 5098053
				WO	9108694
AU	19015/88	MX	9201955	WO	9221214
END OF ANNEX					